

Domain	Correspondence	Range
12. A set of members of a rock band	An instrument each person plays	A set of instruments
13. A set of students in a class	A student sitting in a neighboring seat	A set of students
14. A set of bags of chips on a shelf	Each bag's weight	A set of weights

Determine whether the relation is a function. Identify the domain and the range.

15. $\{(2, 10), (3, 15), (4, 20)\}$
16. $\{(3, 1), (5, 1), (7, 1)\}$
17. $\{(-7, 3), (-2, 1), (-2, 4), (0, 7)\}$
18. $\{(1, 3), (1, 5), (1, 7), (1, 9)\}$
19. $\{(-2, 1), (0, 1), (2, 1), (4, 1), (-3, 1)\}$
20. $\{(5, 0), (3, -1), (0, 0), (5, -1), (3, -2)\}$
21. Given that $g(x) = 3x^2 - 2x + 1$, find each of the following.
 - a) $g(0)$
 - b) $g(-1)$
 - c) $g(3)$
 - d) $g(-x)$
 - e) $g(1 - t)$
22. Given that $f(x) = 5x^2 + 4x$, find each of the following.
 - a) $f(0)$
 - b) $f(-1)$
 - c) $f(3)$
 - d) $f(t)$
 - e) $f(t - 1)$
23. Given that $g(x) = x^3$, find each of the following.
 - a) $g(2)$
 - b) $g(-2)$
 - c) $g(-x)$
 - d) $g(3y)$
 - e) $g(2 + h)$
24. Given that $f(x) = 2|x| + 3x$, find each of the following.
 - a) $f(1)$
 - b) $f(-2)$
 - c) $f(-x)$
 - d) $f(2y)$
 - e) $f(2 - h)$

25. Given that

$$g(x) = \frac{x - 4}{x + 3},$$

find each of the following.

- a) $g(5)$
- b) $g(4)$
- c) $g(-3)$
- d) $g(-16.25)$
- e) $g(x + h)$

26. Given that

$$f(x) = \frac{x}{2 - x},$$

find each of the following.

- a) $f(2)$
- b) $f(1)$
- c) $f(-16)$
- d) $f(-x)$
- e) $f\left(-\frac{2}{3}\right)$

27. Find $g(0)$, $g(-1)$, $g(5)$, and $g\left(\frac{1}{2}\right)$ for

$$g(x) = \frac{x}{\sqrt{1 - x^2}}.$$

28. Find $h(0)$, $h(2)$, and $h(-x)$ for

$$h(x) = x + \sqrt{x^2 - 1}.$$

In Exercises 29 and 30, use a graphing calculator and the TABLE feature set in ASK mode.

29. Given that

$$g(x) = 0.06x^3 - 5.2x^2 - 0.8x,$$

find $g(-2.1)$, $g(5.08)$, and $g(10.003)$. Round answers to the nearest tenth.

30. Given that

$$h(x) = 3x^4 - 10x^3 + 5x^2 - x + 6,$$

find $h(-11)$, $h(7)$, and $h(15)$.

Graph the function.

31. $f(x) = \frac{1}{2}x + 3$

32. $f(x) = \sqrt{x} - 1$

33. $f(x) = -x^2 + 4$

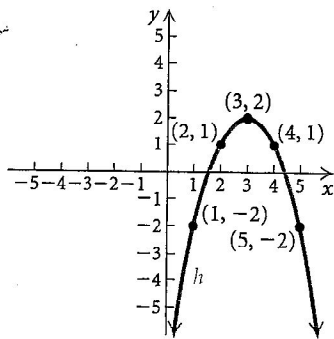
34. $f(x) = x^2 + 1$

35. $f(x) = \sqrt{x-1}$

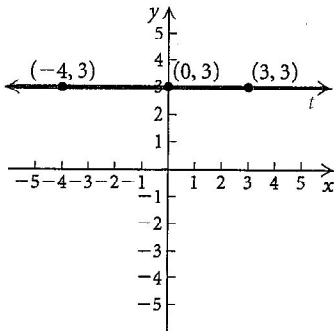
36. $f(x) = x - \frac{1}{2}x^3$

A graph of a function is shown. Using the graph, find the indicated function values; that is, given the inputs, find the outputs.

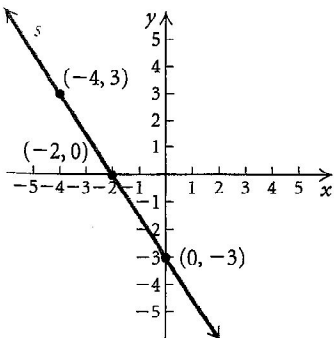
37. $h(1)$, $h(3)$, and $h(4)$



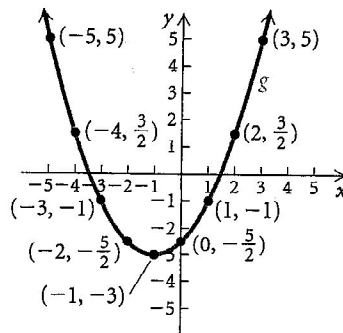
38. $t(-4)$, $t(0)$, and $t(3)$



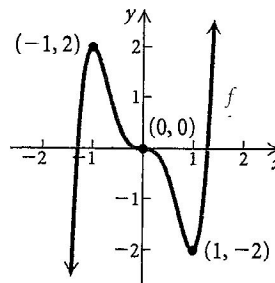
39. $s(-4)$, $s(-2)$, and $s(0)$



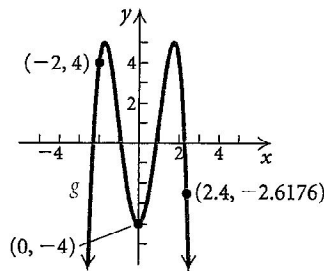
40. $g(-4)$, $g(-1)$, and $g(0)$



41. $f(-1)$, $f(0)$, and $f(1)$

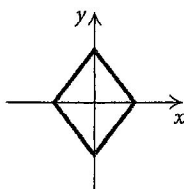


42. $g(-2)$, $g(0)$, and $g(2.4)$

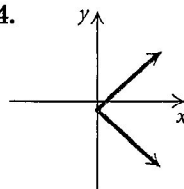


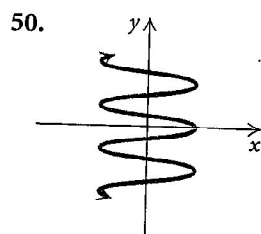
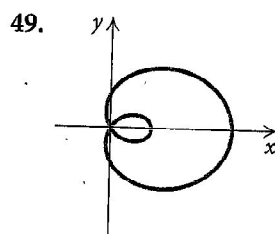
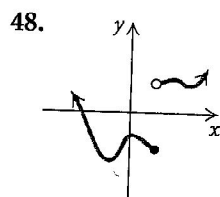
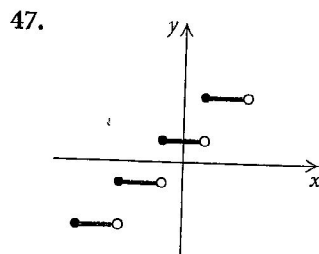
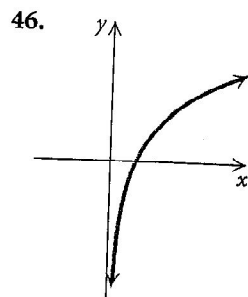
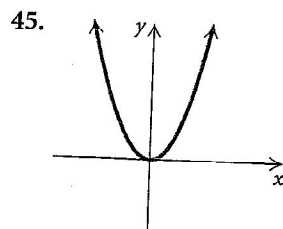
In Exercises 43–50, determine whether the graph is that of a function. An open circle indicates that the point does not belong to the graph.

43.



44.





Find the domain of the function. Do not use a graphing calculator.

51. $f(x) = 7x + 4$

52. $f(x) = |3x - 2|$

53. $f(x) = |6 - x|$

54. $f(x) = \frac{1}{x^4}$

55. $f(x) = 4 - \frac{2}{x}$

56. $f(x) = \frac{1}{5}x^2 - 5$

57. $f(x) = \frac{x + 5}{2 - x}$

58. $f(x) = \frac{8}{x + 4}$

59. $f(x) = \frac{1}{x^2 - 4x - 5}$

60. $f(x) = \frac{(x - 2)(x + 9)}{x^3}$

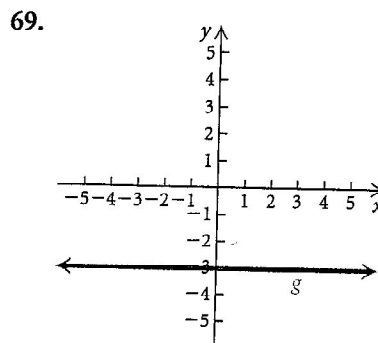
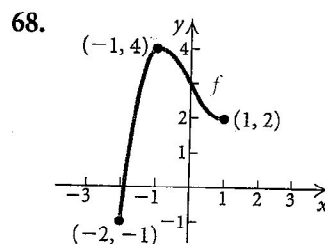
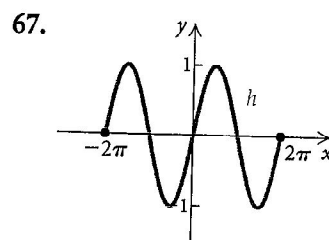
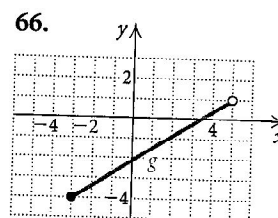
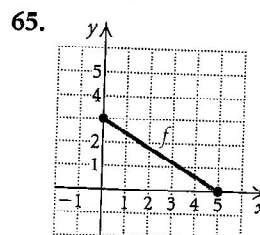
61. $f(x) = \frac{8 - x}{x^2 - 7x}$

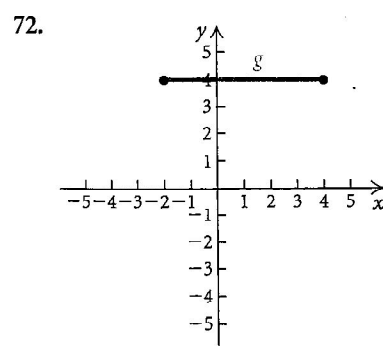
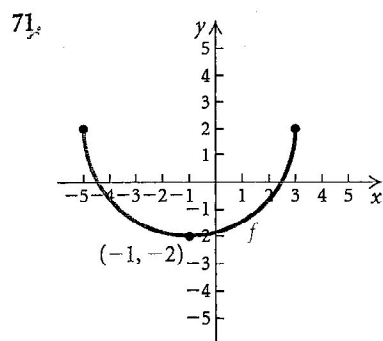
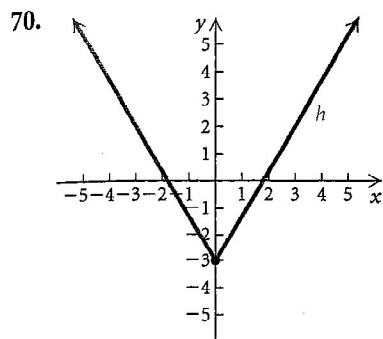
62. $f(x) = \frac{x^4 - 2x^3 + 7}{3x^2 - 10x - 8}$

63. $f(x) = \frac{1}{10}|x|$

64. $f(x) = x^2 - 2x$

In Exercises 65–72, determine the domain and the range of the function.





Graph the function with a graphing calculator. Then visually estimate the domain and the range.

- | | |
|-----------------------------|-------------------------------|
| 73. $f(x) = x $ | 74. $f(x) = x - 2$ |
| 75. $f(x) = \sqrt{9 - x^2}$ | 76. $f(x) = -\sqrt{25 - x^2}$ |
| 77. $f(x) = (x - 1)^3 + 2$ | 78. $f(x) = (x - 2)^4 + 1$ |
| 79. $f(x) = \sqrt{7 - x}$ | 80. $f(x) = \sqrt{x + 8}$ |
| 81. $f(x) = -x^2 + 4x - 1$ | 82. $f(x) = 2x^2 - x^4 + 5$ |

83. *Boiling Point and Elevation.* The elevation E , in meters, above sea level at which the boiling

point of water is t degrees Celsius is given by the function

$$E(t) = 1000(100 - t) + 580(100 - t)^2.$$

At what elevation is the boiling point 99.5° 100° ?

84. *Territorial Area of an Animal.* The territorial area of an animal is defined to be its defended, or exclusive, region. For example, a lion has a certain region over which it is considered ruler. It has been shown that the territorial area T , in acres, of predatory animals is a function of body weight w , in pounds, and is given by the function

$$T(w) = w^{1.31}.$$

Find the territorial area of animals whose body weights are 0.5 lb, 10 lb, 20 lb, 100 lb, and 200 lb.



85. *Decreasing Value of the Dollar.* In 2005, it took \$19.37 to equal the value of \$1 in 1913. In 1990, it took only \$13.20 to equal the value of \$1 in 1913. The amount it takes to equal the value of \$1 in 1913 can be estimated by the linear function V given by

$$V(x) = 0.4123x + 13.2617,$$

where x is the number of years since 1990. Thus, $V(11)$ gives the amount it took in 2001 to equal the value of \$1 in 1913.



Source: U.S. Bureau of Labor Statistics